

REMARKS

Applicants and the undersigned are most grateful for the time and effort accorded the instant application by the Examiner.

Upon entry of the instant Amendment, Claims 1-10 will be all of the claims presently pending before the Examiner. Claims 1-10 are amended. Applicants respectfully submit that no new matter has been added by the present amendments to the claims. Support for these amendments can be found generally throughout the Applicants' disclosure.

For the reasons to follow, the withdrawal of the present rejections and objections is requested.

I. Claim Objections:

Claims 3-10 are objected to as being improper multiple dependent claims. Applicants submit the amendments to the claims have corrected the same and, therefore, the objections can now be withdrawn.

II. Claim Rejections

A. 35 U.S.C. 103(a)

Claims 1-10 stand rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Pandey et al, (Synthesis 1982), hereinafter Pandey, in view of Brown et al. (USPN 2,765,335), hereinafter Brown.

As best understood, Pandey relates to a "[m]ethod for the hydrodehalogenation of aryl chlorides, bromides, and iodides...by heating these aryl halides in formic acid/dimethylformamide in the presence of a catalytic amount of palladium-on-carbon." (Page 876) Examples of such aryl halides of Pandey include 6-chloro-meta-cresol. (Table) The Office opines that the differences between the Pandey method and the presently claimed invention are the failure of Pandey et al. to teach: a) titanium oxide or

aluminum oxide as catalyst support, b) the presently claimed reaction temperature, and c) the amount of hydrogen presently employed. The Office looks to the Brown reference for the missing teachings.

As best understood, Brown teaches a hydrodehalogenation reaction of ortho-cresol, such as 6-chloro-o-cresol, wherein the ortho-cresol is reacted with hydrogen in the presence of a vapor phase hydrogenation catalyst such as platinum, palladium, silver, nickel or copper. With respect to the preferred catalyst of the Brown invention, nickel, the same is taught as being supported on a refractory material such as aluminum or silicon compounds. Brown explains that nickel catalyst on a support may be formed by impregnating the support with an oxide or salt of the nickel and reducing the same by means of hydrogen. The reaction may be conducted at a temperature range of 300 to 350 degrees C.

In light of Pandey and Brown the Office concludes it would have been obvious to the skilled artisan to use the nickel catalyst support of Brown, alumina or silica, in the process taught by Pandey and to adjust the reaction temperature based on the catalyst employed. Applicants must respectfully disagree that the presently claimed invention is obvious over Pandey in view of Brown for the following reasons.

As the Supreme Court explained in *KSR International Co. v. Teleflex Inc. (KSR)*, 82 USPQ2d 1385 (2007), the underpinning to obviousness based on the combinations of references is predictability. (See also, MPEP 2413 Rev. 6 Exemplary Rationales)

In this instance the combination of elements is made from two references disclosing two different types of hydrodehalogenation reactions resulting in the combinations being unpredictable and thus non-obviousness. Additionally, in further support of the non-obviousness are, inter alia, superior/unexpected results and a lack of motivation and expectation of success in making the proposed combination. In light of the shortcomings of the cited prior art, discussed more fully below, the present obviousness rejections should now be withdrawn.

Firstly, it is clear that the presently claimed invention provides unexpected and superior long term stability results as compared to the teachings of the references. As taught by Brown, the use of alumina as nickel catalyst support in the hydrodehalogenation reaction is relatively short lived. After the first 54 hours "[t]he catalyst [begins] to show signs of poisoning and the percentage of o-cresol in the product gradually [falls]." (Col. 4, Lines 47-49) While the reaction disclosed in Pandey is not directly comparable to the presently claimed invention, since it relates to a liquid reactant hydrodehalogenation reaction, it is worth noting in any event that there is shown in the present application's comparative example 3, a reaction using palladium on carbon extrudate. In that reaction, deactivation was noticed within 48 hours.

In comparison to the above, as shown in the Applicants' other examples, the selection of a catalyst and catalyst support in accordance with the claimed invention results in long term stability. As shown, for example, in Example 4, the deactivation of the catalyst did not occur after several weeks. This is completely unexpected based on teachings of Pandey and Brown.

Brown also discloses the use of a catalyst support only with nickel catalyst. While Brown discloses other vapor phase hydrogenation catalysts, such as platinum and palladium, there is no indication that they are used in any manner other than in their pure metal form. The use of nickel with a support media as disclosed in Brown is demonstrated as a means of convenience (Col. 2, Line 14) not as a means for increasing catalyst stability. The disclosure of Brown's catalyst support process supports the unexpectedness of the presently claimed invention's superior results.

Furthermore, as indicated above, Pandey relates to a hydrodehalogenation reaction performed with liquid reactants via a reflux apparatus. In stark contrast stands Brown in which a hydrodehalogenation reaction is performed with gaseous reactants using a tubular reactor apparatus. The references cited provide no teaching or suggestion that the support materials for these different types of hydrodehalogenations are interchangeable. Specifically, there is no teaching or suggestion to one skilled in

the art for the expectation of a successful substitution of the palladium-on-carbon catalysts of Pandey with the support materials (e.g., aluminum or silicon compounds) of Brown. This fact naturally supports the conclusion that one skilled in the art would not have expected that the combination of Pandey and Brown would be successful. Likewise, the lack of an expectation of success combined with the unexpected results, discussed above, further indicate a lack of motivation to make such a combination between different types of reactions.

In light of the unpredictability of the combination of reactions, the unexpected results of the presently claimed process, and the lack of motivation and expectation for success in the combination, Applicants respectfully submit the presently claimed invention is not obvious with respect to the cited references.

II. Conclusion

In view of the foregoing, it is respectfully submitted that independent Claim 1 is fully distinguishable over the applied art and is thus in condition for allowance. By virtue of dependence from what is believed to be an allowable independent Claim 1, it is respectfully submitted that remaining claims are also presently allowable. Notice to the effect is earnestly solicited. If there are any further issues in this application, the Examiner is invited to contact the undersigned at the telephone number listed below.

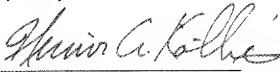
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Respectfully,

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